

# Science Model Driven Autonomous Sensor Web

PI: Ashley Davies, JPL

## Objective

To maximize science data return and optimize asset and resource use of an existing sensor web by including volcanic process models in the control loop.

We will modify an existing sensor web that has a simple trigger-reaction mode, to one that uses a volcanic process model to guide the reaction. For example: a ground sensor detects increasing activity, causing the sensor web to seek additional key data as input for a model of a volcanic process to determine volcano state.

This effort will integrate automated retasking and science process modeling to enable true science-driven sensor web operations.

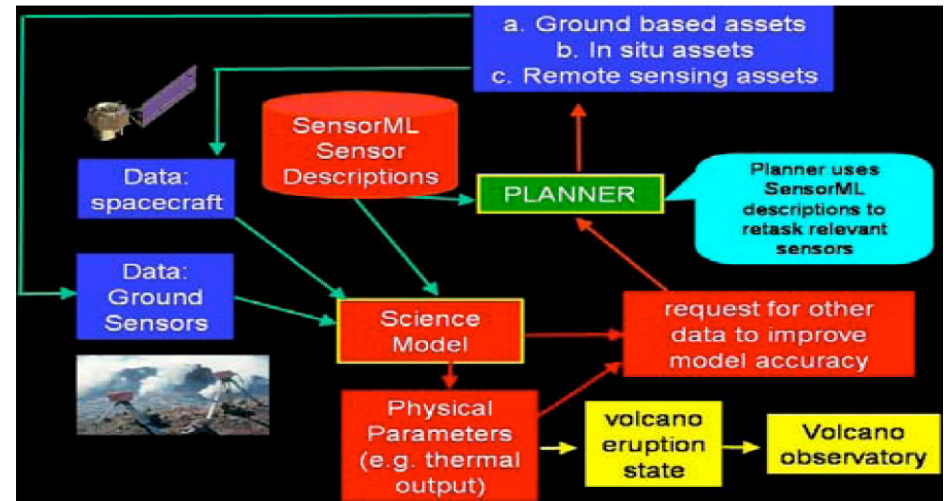
## Approach

- We will define the "State of the Volcano" and track this state using SensorML, with integration of an eruption process model, and with automated data processing and asset re-tasking.
- We will demonstrate an autonomous 'closed loop' of information transfer from trigger event to processing through the sensor web hub at JPL, spacecraft observation, data analysis, and back to the trigger origin (to volcanologists in the field).

## Co-PIs/Partners

Rebecca Castaño and Steve Chien /JPL; Robert Wright /U. Hawai'i; Philip Kyle /New Mexico Tech; Thomas Doggett /ASU; Felipe Ip /U. Arizona

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Data flow of proposed prototype Model-based Sensor Web.

## Key Milestones

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|---|---------|
| • Complete "State of the Volcano" definitions | 03/2007 |
| • Complete Sensor Web design                  | 04/2007 |
| • SensorML coding complete                    | 09/2007 |
| • Field testing and verification              | 11/2007 |
| • Demonstrate operational system              | 12/2007 |

TRL<sub>in</sub> = 3

